Appl. No. 10/633,015
Amendment under 37 CFR 1.116 Expedited Procedure
Examining Group 3732 dated June 8, 2005

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (currently amended) A computer-implemented method for separating gingiva from a tooth on a computer model of the gingiva and the tooth, the method comprising:

defining a cutting surface along the gingiva;

modeling a crown surface of the tooth; and

applying the cutting surface to the tooth to separate the gingiva from the tooth.

2.   (original) The method of claim 1, wherein the cutting surface is curved.

3.   (original) The method of claim 1, wherein the cutting surface is expressed as a function.

4.   (original) The method of claim 1, wherein the cutting surface is expressed as a spline function and a quadratic function.

5.   (original) The method of claim 1, wherein the cutting surface is expressed as a spline function and a parabolic function.

6.   (original) The method of claim 1, wherein the cutting surface is interactively adjusted.

7.   (original) The method of claim 4, wherein the interactive adjustment of the cutting surface modifies a function defining the cutting surface.

8.   (currently amended) The method of claim 4, further comprising interactively highlighting the separated ~~portion~~ gingiva.

9.   (currently amended) The method of claim 8, further comprising interactively highlighting ~~the~~ a border of the separated ~~portion~~ gingiva.

10.   (original) The method of claim 1, wherein the cutting surface is defined by specifying a basis for the tooth.

11.   (original) The method of claim 1, further comprising finding a gingival line separating a tooth surface and a gingiva.

12.   (original) The method of claim 11, further comprising finding the high curvature location on the tooth surface.

13.   (original) The method of claim 11, further comprising fitting a spline to the gingival line.

14.   (original) The method of claim 1, wherein the cutting surface further comprises a plurality of surfaces.

15.   (original) The method of claim 14, wherein the root of the tooth is modeled as a parabolic surface below a gingival line.

16.   (original) The method of claim 14, further comprising defining an enclosing surface to enclose the crown of the tooth.

17.   (currently amended) The method of claim 14, further comprising:
        displaying the cutting surface specified with a plurality of nodes;
        adjusting one or more nodes to modify the surface; and
        applying the surface to separate the gingiva from the tooth.

18.   (original) The method of claim 17, further comprising providing a handle to adjust each orientation of the cutting shape.

19.   (original) The method of claim 17, wherein adjusting one or more nodes further comprises moving one or more nodes.

20.   (original) The method of claim 17, wherein the cutting surface is formed using a function in a cylindrical coordinate system.

21.   (currently amended) A system for separating gingiva from a tooth on a computer model of the gingiva and the tooth, the system comprising:

　　　　means for defining a cutting surface along the gingiva;

　　　　means for modeling a crown surface of the tooth; and

　　　　means for applying the cutting surface to the tooth to separate the gingiva from the tooth.

22.   (currently amended) A computer program, residing on a tangible storage medium, for use in separating gingiva from a computer model of a tooth, the program comprising executable instructions operable to cause a computer to:

　　　　define a cutting surface along the gingiva;

　　　　model a crown surface of the tooth; and

　　　　apply the cutting surface to the tooth to separate the gingiva from the tooth in a single cut.

23.   (currently amended) A computer program, residing on a tangible storage medium, for use in separating gingiva from a computer model of a tooth, the program comprising executable instructions operable to cause a computer to:

　　　　define a cutting surface along the gingiva, wherein the cutting surface is expressed as a spline function and a quadratic function;

　　　　model a crown surface of the tooth; and

　　　　apply the cutting surface to the tooth to separate the gingiva from the tooth in a single cut.

24.   (currently amended) A computer, comprising:

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a processor;

a data storage device coupled to the processor, the data storage device containing a computer program ~~code~~ for use in separating gingiva from a computer model of a tooth, the program comprising executable instructions operable to cause a computer to:

define a cutting surface along the gingiva, wherein the cutting surface is expressed as a spline function and a quadratic function, and wherein the cutting surface further comprises a plurality of surfaces, and wherein ~~the~~ a root of the tooth is modeled as a parabolic surface below a gingival line; and

apply the cutting surface to the tooth to separate the gingiva from the tooth.

25.   (original) The system of claim 24, further comprising instructions to define an enclosing surface to enclose the crown of the tooth.

26.   (original) A computer-implemented method for separating tooth from gingiva, comprising:

defining a cutting surface along the gingiva; and

applying the cutting surface to the tooth to separate the gingiva and reconstruct the root for the tooth.

27.   (new) The method of claim 1, further comprising:

visually displaying the cutting surface to a user as two surfaces representing opposed sides of the separation between the gingival and the tooth; and

allowing the user to determine whether to separate the gingival from the tooth.

28.   (new) The method of claim 1, wherein the crown surface is modeled as a one or more functions.

29.   (new) The method of claim 28, wherein the crown surface is modeled as a quadratic function in polar coordinates.

30.   (new) The method of claim 1, further comprising allowing a user to change a shape of the crown surface.

31.   (new) The method of claim 30, wherein allowing the user to change the shape comprises allowing the user to move at least one of crown control points, top control points and a gingival line.